

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)



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Applicant's or agent's file reference PCT04-008	FOR FURTHER ACTION	See Form PCT/IPEA/416
International application No. PCT/KR2004/001489	International filing date(day/month/year) 21 JUNE 2004 (21.06.2004)	Priority date (day/month/year) 26 JUNE 2003 (26.06.2003)
International Patent Classification (IPC) or national classification and IPC IPC7 E04F 13/12		
Applicant ROSER CO., LTD. et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
- a. ☒ (sent to the applicant and to the International Bureau) a total of 16 sheets, as follows:
- ☒ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
- ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
- b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____ containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
- ☒ Box No. I Basis of the report
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand 08 DECEMBER 2004 (08.12.2004)	Date of completion of this report 28 SEPTEMBER 2005 (28.09.2005)
Name and mailing address of the IPEA/KR  Korean Intellectual Property Office 920 Dunsan-dong, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer JEONG, Kyu Young Telephone No. 82-42-481-8124 

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/KR2004/001489

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language _____ which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
- ☐ publication of the international application (under Rule 12.4)
- ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages _____ as originally filed/furnished
- pages* 1-13 _____ received by this Authority on 27.05.2005
- pages* _____ received by this Authority on _____
- ☒ the claims:
- pages _____ as originally filed/furnished
- pages* _____ as amended (together with any statement) under Article 19
- pages* 14 _____ received by this Authority on 27.05.2005
- pages* _____ received by this Authority on _____
- ☒ the drawings:
- pages 2-3 _____ as originally filed/furnished
- pages* 1 _____ received by this Authority on 27.05.2005
- pages* _____ received by this Authority on _____
- ☐ the sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.
3. ☒ The amendments have resulted in the cancellation of:
- ☐ the description, pages _____
- ☒ the claims, Nos. 3 _____
- ☐ the drawings, sheets _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/KR2004/001489

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1 - 2	YES
	Claims		NO
Inventive step (IS)	Claims	1 - 2	YES
	Claims		NO
Industrial applicability (IA)	Claims	1 - 2	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Reference is made to the following documents:

D1: US 6128866 A (10 October 2000)

D2: JP 62-182314 U (19 November 1987)

D3: JP 3-120711 U (11 December 1991)

D1 relates to an exterior building component for installation on a building. D2 relates to a panel comprising upper interlocking folds (6, 6'), lower interlocking folds (13, 13'), and locking parts (7, 7a, 7b, 7c). D3 relates to a panel comprising upper interlocking folds (11, 12), lower interlocking folds, and locking parts (6d) (see Fig 5).

Novelty

Claim 1 of the present invention relates to a panel having interlocking folds which are used as an interior or exterior finishing material for buildings, comprising outer interlocking folds, inner interlocking folds and a locking part. Said technical features of claim 1 are different from those of D1-D3. Therefore, the subject matter of claim 1 is considered to be novel.

The subject matter of dependent claim 2 referring to claim 1 is also considered to be novel.

(Continued on Supplemental Sheet.)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/KR2004/001489

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

Box V.

Inventive Step

The outer interlocking folds and the inner interlocking folds of claim 1 are functionally similar to the upper interlocking folds (6, 6') and the lower interlocking folds (13, 13') of D2 and the upper interlocking folds (11, 12) and the lower interlocking folds of D3. However, the locking part of claim 1 which is diagonally extended on the same plane as that of the panel body involves a particular effect. In addition, said technical feature of claim 1 cannot be readily derived from D1-D3 by a person skilled in the art. Therefore, the subject matter of claim 1 is considered to involve an inventive step.

Dependent claim 2 referring to claim 1 adds a specific technical feature to claim 1. Therefore, the subject matter of claim 2 is also considered to involve an inventive step.

PANEL HAVING INTERLOCKING FOLDS USED AS INTERIOR OR
EXTERIOR FINISHING MATERIAL FOR BUILDINGS

Technical Field

The present invention relates, in general, to panels
5 having interlocking folds which are used as interior and
exterior finishing materials for buildings and, more
particularly, to a panel having interlocking folds which is
used as an interior or exterior finishing material for
buildings, and is easily installed on a roof or on an
10 indoor or outdoor wall surface of a building to provide a
decorative roofing or wall covering, with a function of
preventing a backflow of water into gaps between the
interlocking folds of seamed panels by wind action.

Background Art

15 Generally, buildings are fabricated with columns,
walls and roofs, which protect the interiors of the
buildings from the outdoor environment and thereby provide
comfortable indoor spaces to inhabitants. To accomplish the
above-mentioned functions of the buildings, the roofs, and
20 the indoor and outdoor wall surfaces must be constructed to
have thermal-insulating and water-resistant structures.
Furthermore, typically, the roofs and the indoor and
outdoor wall surfaces of buildings are covered with

decorative interior and exterior finishing materials to provide attractive appearances of the buildings, resulting in beautification of residential areas, towns and cities where the buildings are placed.

5 In the related art, a variety of stone panels and metal panels have been proposed as the interior and exterior finishing materials for buildings. Of the conventional interior and exterior finishing panels for buildings, the stone panels are problematic in that an
10 installation thereof on a building must be accompanied by an additional sealing process to seal the joints of the panels, thus causing a difficulty during a process of installing the stone panels. Furthermore, the stone panels are heavy, so that workers suffer exhaustion and injury
15 while handling the stone panels.

Thus, in place of the stone panels having the above-mentioned problems, metal panels have been preferably used in recent years. The metal panels as the interior and exterior finishing materials for buildings are purchased at
20 low costs, quickly installed, and provide more beautiful appearances to buildings, in comparison with the stone panels. Thus, many consumers prefer the metal panels to the stone panels.

Most conventional metal panels, which have been
25 proposed as the interior and exterior finishing materials for buildings, are constructed as types to be seamed together through a fold-interlocking manner. In a detailed

description, each of the conventional metal panels to be
seamed together through the fold-interlocking manner
comprises a rectangular, square or rhombic panel body, of
which two neighboring sides are folded outwardly to provide
5 outer interlocking folds, and two remaining sides are
folded inwardly to provide inner interlocking folds.

Thus, when installing a plurality of metal panels
having the interlocking folds on a support surface, one of
the two outer interlocking folds of a metal panel
10 interlocks with one of the two inner interlocking folds of
another metal panel, thus seaming the two metal panels
together. The above-mentioned interlocking of the outer and
inner interlocking folds is repeated to provide a fold-
interlocking structure. Thus, the fold-interlocking metal
15 panels provide a decorative roofing or a decorative wall
covering.

In the above state, to fasten the fold-interlocking
metal panels as the interior and exterior finishing
materials for buildings to a roof or an indoor or outdoor
20 wall surface, locking brackets as well as locking nails
must be used.

However, because the conventional metal panels having
the interlocking folds, used as the interior and exterior
finishing materials for buildings, must be fastened to the
25 roof or the indoor or outdoor wall surface by means of
locking brackets as well as locking nails, the metal panels
require many locking members, causing a problem in that the

process of installing the metal panels is complicated.

Furthermore, fine gaps unavoidably remain in the outer and inner interlocking folds of the seamed conventional metal panels used as the interior and exterior finishing materials of a building. Thus, the conventional metal panels are problematic in that the metal panels cannot prevent a backflow of water into gaps between the interlocking folds of the seamed panels by wind action.

Disclosure of the Invention

Accordingly, the present invention has been made keeping in mind the above problems occurring in the prior art, and an object of the present invention is to provide a panel having interlocking folds which is used as an interior or exterior finishing material for buildings, and simplifies the construction of a locking part thereof, thus being easily installed on a roof or on an indoor or outdoor wall surface of a building, and which prevents a backflow of water into gaps defined between the interlocking folds of seamed metal panels.

In order to accomplish the above object, the present invention provides a panel having interlocking folds which is used as an interior or exterior finishing material for buildings, comprising: a panel body having a tetragonal sheet shape; outer interlocking folds provided on a surface of the panel body by folding outwardly two neighboring

sides of the panel body so that the outer interlocking folds extend in parallel to the surface of the panel body; inner interlocking folds provided on the other surface of the panel body by folding inwardly two remaining sides of the panel body opposite to the outer interlocking folds so
5 that the inner interlocking folds extend in parallel to the other surface of the panel body; and a locking part to be fastened to a support surface by a locking nail, the locking part being provided on a corner of the panel body
10 between the outer interlocking folds or the inner interlocking folds while diagonally extending on a same plane as that of the panel body.

In the panel, the outer interlocking folds may be provided with a backflow prevention cap to guide water to
15 the panel body while preventing a backflow of the water driven by wind into gaps defined between the outer interlocking folds of the panel and corresponding inner interlocking folds of neighboring panels that interlock with the outer interlocking folds of the panel.

20 In the panel, both the panel body and the outer interlocking folds may be coated, on outer surfaces thereof, with stone powders.

Brief Description of the Drawings

The above and other objects, features and other
25 advantages of the present invention will be more clearly

understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view showing the construction of a panel having interlocking folds, which is used as an interior or exterior finishing material for buildings, according to an embodiment of the present invention;

FIG. 2 is a development view of the panel according to the embodiment of the present invention;

FIG. 3 is a perspective view showing a fold-interlocking method of seaming two panels according to the embodiment of the present invention together;

FIG. 4 is a plan view of a plurality of panels according to the embodiment of the present invention, which are seamed together through the fold-interlocking method;

FIGS. 5a, 5b and 5c are perspective views respectively showing backflow prevention caps used with the panel having the interlocking folds, according to different modifications of the embodiment of the present invention; and

FIG. 6 is a perspective view showing the construction of a panel having interlocking folds, which is used as an interior or exterior finishing material for buildings, according to another embodiment of the present invention.

Best Mode for Carrying Out the Invention

Reference should now be made to the drawings, in

which the same reference numerals are used throughout the different drawings to designate the same or similar components.

FIG. 1 is a perspective view showing the construction of a panel having interlocking folds, which is used as an interior or exterior finishing material for buildings, according to an embodiment of the present invention. As shown in the drawing, the panel of the present invention comprises a panel body 1 having a tetragonal sheet shape with four equal sides. The panel further comprises two outer interlocking folds 3, two inner interlocking folds 5, and a locking part 7 which are provided on the panel body 1.

The panel body 1 defines a base body of the panel, and is preferably constructed to have a rhombic or square shape. However, it should be understood that the body 1 may be constructed in the form of a rectangular shape, without affecting the functioning of the present invention. When installing the panel on a building, the panel body 1 is placed on a roof or on an indoor or outdoor wall surface of the building so that two diagonal axes of the panel body 1 are respectively aligned along vertical and horizontal lines on the roof or the wall surface. Thus, the bodies 1 of a plurality of panels can continuously interlock together while being continuously arranged along oblique lines on the roof or the indoor or outdoor wall surface. To accomplish the above-mentioned continuous interlocking of

the panel bodies 1, each of the panel bodies 1 is provided with the two outer interlocking folds 3 and the two inner interlocking folds 5.

5 To provide the two outer interlocking folds 3, two neighboring sides of the panel body 1 around an apex are folded forwardly. In a detailed description, to provide the two outer interlocking folds 3, specified parts around the four apexes of the panel body 1 are appropriately cut off as shown by the dotted lines in FIG. 2, so that the locking
10 part 7 is provided at a top corner of the panel body 1. Thereafter, two neighboring sides of the panel body 1 around the locking part 7 are folded outwardly as shown by the arrows 'a' in the drawing, thus providing the two outer interlocking folds 3 which extend in parallel to a surface
15 of a remaining part of the panel body 1. In the above state, the locking part 7 remains at the top corner between the two outer interlocking folds 3 while diagonally extending on a same plane as that of the panel body 1.

In the meantime, the two inner interlocking folds 5
20 are provided on the other surface of the panel body 1 so that the location of the two inner interlocking folds 5 is opposite to that of the two outer interlocking folds 3. In a detailed description, to provide the two inner interlocking folds 5, two remaining sides of the panel body
25 1 which are opposite to the above-mentioned two neighboring sides for the outer interlocking folds 3, in other words, the two neighboring sides around a bottom corner of the

panel body 1 opposite to the locking part 7 are folded inwardly as shown by the arrows 'b' in the drawing, thus providing the two inner interlocking folds 3 which extend in parallel to the other surface of the panel body 1.

5 As shown in FIG. 3, to seam a plurality of panels together through a fold-interlocking method, one of the two outer interlocking folds 3 of a first panel 9 interlocks with one of the two inner interlocking folds 5 of a second panel 11. Furthermore, the other of the two inner
10 interlocking folds 3 of the first panel 9 interlocks with one of the two outer interlocking folds 5 of a third panel. When the above-mentioned fold-interlocking of the panels is repeated on a roof or on an indoor or outdoor wall surface, a decorative roofing or a decorative wall covering is
15 provided as shown in FIG. 4.

 In the above state, the locking part 7 is fastened to the roof or the indoor or outdoor wall surface by means of a locking nail 13. Thus, the bodies 1 of the panels which interlock with each other at the outer and inner
20 interlocking folds 3 and 5 thereof are easily fastened to the roof or the indoor or outdoor wall surface.

 In a detailed description, because the locking part 7 of each panel is provided at a position around the top corner between the two outer interlocking folds 3 while
25 extending in a vertical direction aligned with one of the two diagonal axes of the panel body 1, each of the panels 9 and 11 is easily and simply fastened to the roof or the

indoor or outdoor wall surface through a single process of driving the locking nail 13 at the locking part 7. In the present invention, the number of locking nails 13 used for fastening each of the panels 9 and 11 to the roof or the indoor or outdoor wall surface is preferably set to one or two in response to the size of the panel body 1.

A backflow prevention cap 15 is preferably installed in the panel as shown in FIG. 1. That is, the cap 15 is inserted into the upper parts of the two outer interlocking folds 3 in order to close the upper parts. In the above state, the backflow prevention cap 15 also covers the locking part 7 and closes the corresponding lower parts of inner interlocking folds 7 of two neighboring panels that interlock with the outer interlocking folds 3 of the panel.

The backflow prevention cap 15 is constructed to prevent a backflow of water driven by wind from the panel body 1 of each panel into the gaps between the outer interlocking folds 3 of the panel and the inner interlocking folds 5 of neighboring panels that interlock with the outer interlocking panels 3. In a detailed description, the outer and inner interlocking folds 3 and 5 of seamed panels closely interlock with each other, but the gaps unavoidably remain in the interlocking outer and inner interlocking folds 3 and 5 of the seamed panels. Thus, water, which drops onto the panel body 1 or the outer interlocking folds 3 of a panel, may flow backward into the gaps between the outer and inner interlocking folds 3 and 5

of the seamed panels by wind action so that the water may be introduced into the roof or the indoor or outdoor wall surface. However, the backflow prevention cap 15 of the present invention prevents such a backflow of water driven by wind into the gaps between the outer and inner interlocking folds 3 and 5 of the seamed panels, but guides the water onto the outer surface of the panel body 1.

The backflow prevention cap 15 of the present invention may be variously constructed as shown in FIGS. 5a, 5b and 5c. The backflow prevention cap 15 of FIG. 5a is equal to the cap that is shown in FIG. 1 and is fastened to a support surface by means of a locking nail 13. The backflow prevention cap 17 of FIG. 5b may be fitted into the upper parts of the two outer interlocking folds 3 of a panel before two corresponding inner interlocking folds 5 of two neighboring panels interlock with the outer interlocking folds 3 of the panel having the cap 17. Alternatively, the backflow prevention cap 17 of FIG. 5b may be supported in the upper parts of the two outer interlocking folds 3 of the panel body 1 using an appropriate adhesive. Each of the backflow prevention caps 15 and 17 of FIGS. 5a and 5b prevents a backflow of water into the gaps between the outer and inner interlocking folds of the seamed panels, and, furthermore, guides the water onto the outer surface of the panel body 1. In the meantime, the backflow prevention cap 19 of FIG. 5c has a function of only preventing the backflow of water into the

gaps between the outer and inner interlocking folds of the
seamed panels. The backflow prevention cap 19 of FIG. 5c is
fastened to a support surface by means of a locking nail 13
in the same manner as that described for the backflow
5 prevention cap 15 of FIG. 5a.

As shown in FIG. 6, each of the panels 9 and 11 may
be produced in the form of a stone powder-coated structure,
in which stone powders 20 are coated on the outer surfaces
of both the panel body 1 and the outer interlocking folds 3
10 of the panel. The stone powders 20 may have various colors
to enhance the decoration effect of the panel used as a
decorative interior or exterior finishing material for
buildings.

Industrial Applicability

15 As described above, the present invention provides a
panel having interlocking folds that is used as an interior
or exterior finishing material for buildings. The panel is
provided with two outer interlocking folds on a surface
thereof, and two inner interlocking folds on the other
20 surface thereof, with a locking part provided at a position
between the two outer interlocking folds so that the
locking part extends on a same plane as that of a panel
body. Thus, in comparison with a conventional panel that is
fastened to a roof or an indoor or outdoor wall surface of
25 a building by means of a locking bracket, the panel of the

present invention is more easily simply fastened to the roof or the indoor or outdoor wall surface through a single process of driving a locking nail at the locking part. Thus, the present invention simplifies the process of installing the panels on a roof or on an indoor or outdoor wall surface of a building. Furthermore, a backflow prevention cap is used for covering the locking part and, at the same time, closing the upper parts of the outer interlocking folds of the panel around the locking part, so that the backflow prevention cap effectively prevents a backflow of water driven by wind into gaps between the inner and outer interlocking folds of seamed panels that interlock with each other, different from a conventional panel which does not have such a backflow prevention cap.

Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

Claims

1. (Amended) A panel, used as an interior or exterior
finishing material for buildings, comprising a panel body
having a tetragonal sheet shape, outer interlocking folds
provided on a surface of the panel body by folding outwardly
two neighboring sides of the panel body; and inner
interlocking folds provided on the other surface of the
panel body by folding inwardly two remaining sides of the
panel body is characterized in that;
the locking part provided at a corner of the panel
body between the outer interlocking folds is diagonally
extended on a same plane as that of the panel body.

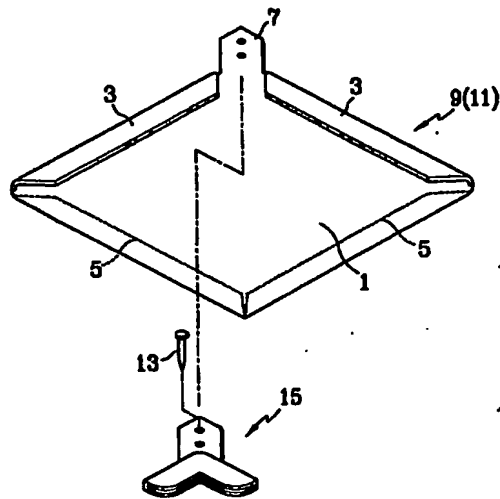
2. The panel according to claim 1, wherein the outer
interlocking folds are provided with a backflow prevention
cap to guide water to the panel body while preventing a
backflow of the water driven by wind into gaps defined
between the outer interlocking folds of the panel and
corresponding inner interlocking folds of neighboring
panels that interlock with the outer interlocking folds of
the panel.

3. (Deleted)

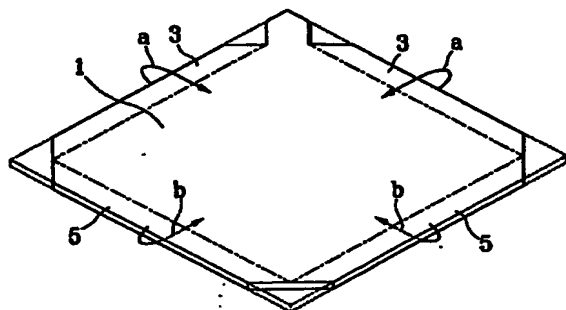
Abstract

A panel having interlocking folds is used as an interior or exterior finishing material for buildings. The panel is easily installed on a support surface, and has a function of preventing a backflow of water into gaps between the interlocking folds of seamed panels by wind action. The panel includes a tetragonal panel body (1), two outer interlocking folds (3) provided by folding outwardly two neighboring sides of the panel body to extend in parallel to a surface of the panel body, two inner interlocking folds (5) provided by folding inwardly two remaining sides, opposite to the outer interlocking folds, to extend in parallel to the opposite surface, and a locking part (7) provided at a corner between the two outer interlocking folds to be fastened to a support surface by a locking nail.

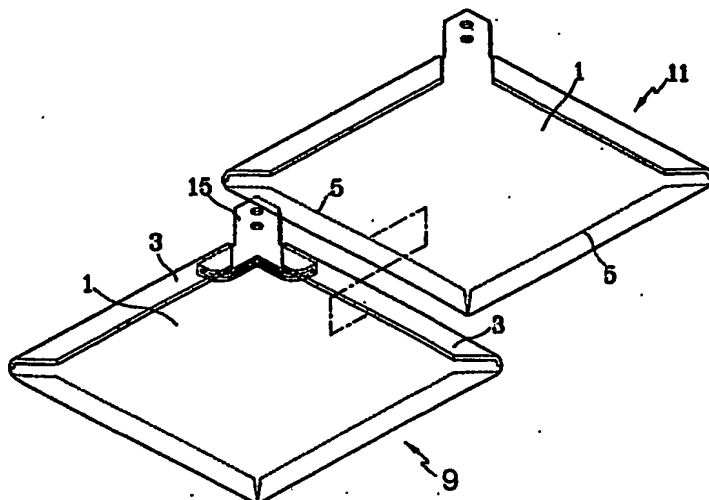
[FIG.1]



[FIG.2]



[FIG.3] (Amended)



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